EFFECT OF ORAL MOTOR STIMULATION ON DROOLING AMONG CHILDREN WITH CEREBRAL PALSY AT SELECTED CENTRES IN COIMBATORE

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This is to certify that the dissertation entitled **"Effect of Oral Motor Stimulation on Drooling among Children with Cerebral Palsy at Selected Centres in Coimbatore"** is a bonafide work done by **Rekha. M.P, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences** in partial fulfillment of the University rules and regulations for award of **M.Sc. Nursing Degree** under my guidance and supervision during the academic year **2014.**

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Abstract

An interventional study was conducted to assess the effectiveness of oral motor stimulation on drooling among children with cerebral palsy at, Amrit centre for special needs and Women Volunteer Service (WVS) special school, Coimbatore. Pre experimental one group pre test post test design was used to conduct the study. A purposive sample of 25 children with cerebral palsy who have drooling were included in this study. Pre assessment was done by using drooling quotient scale for children with cerebral palsy. Oral motor stimulation was administered to the children by the researcher for a duration of twenty minutes daily for a period of 4 weeks to each child in a comfortable environment. The post test was done using the same tool at the end of the intervention. The obtained data were analyzed using paired ‘t’ test. It was identified that the mean drooling quotient before and after oral motor stimulation was 83.55 and 72.05 with a standard deviation of 4.46 and 7.41 respectively. The calculated ‘t’ value was 7.69. The result revealed that there was a significant reduction in drooling after the implementation of oral motor stimulation. Hence, it was concluded that oral motor stimulation was effective in reducing drooling among children with cerebral palsy.

INTRODUCTION

Childhood is the first stage in our life's cycle. We start growing from that very point. That is the time where we are true humans with innocent looks and real smile on our face, having no knowledge about the world. But we learn lot from that stage of our life.

Cerebral palsy (CP) is an umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of development (Mutch et al, 1992). Cerebral palsy describes a group of disorders of the development of movement and posture, causing activity limitation that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain (Bax et al, 2004).

The main causes of cerebral palsy are due to damage occurring to the developing brain. This damage can occur during pregnancy, delivery, the first month of life or less commonly in early childhood. Other causes are prematurity, low birth weight, breathing meconium into the lungs and genetic problems (Yadav, 2011).

Cerebral palsy is classified on the basis of motor impairment of limbs or organs, and by restriction to the activities an affected person may perform. There are three main classification of cerebral palsy. They are, spastic, ataxic and athetoid or diskinetic. Additionally there is a mixed type that shows combination of features of other types. These classifications also reflect the areas of brain that are damaged (Ganesh, 2012).

Drooling (sialorrhea) is the unintentional loss of saliva from the mouth. It is a normal phenomenon of infancy that subsides usually by 15-18 months as a consequence of physiological maturity of oral motor function. Drooling children frequently have irritated facial skin, foul odour, and in cold weather, the dampness from saliva is chilling. Dehydration experience can be a recurrent problem from chronic fluid loss. They may also damage books, toys, computers, and other communication aids. Other factors contributing to drooling are the child's emotional state, head position, sitting posture, concentration, decreased oral sensory awareness and ability to breathe through the nose. A number of these factors have been investigated in relation to drooling and in all instances a positive correlation was found with the severity of drooling (Bushan, 2010).

Cerebral palsy (CP) is a non-progressive neurological disorder of children. Most of the children have multiple neurological deficits and variable mental handicap. The predominant deficit is motor disability. It may be accompanied by perceptual problems, language deficits and intellectual impairment. In addition to the motor disability, children with CP often have other handicaps such as speech disability in about half to three quarters of the cases, mental retardation in about half the cases, impaired hearing and vision, psychological disabilities and seizures. CP results from damage to the brain occurring in fetal life, during delivery, or in early infancy. There are mainly two classification of cerebral palsy, (i.e.) the topographical classification, which shows how many limbs are affected because of brain damage like monoplegia, diplegia, triplegia, quadriplegia, and the classification based on types of clinical features which include spastic, athetoid, ataxic or mixed types (Giesal, 2011).

Spasticity is a form of muscular hyper tonicity with increased resistance to stretch. It usually involves the flexors of the arms and extensors of the legs. The hyper tonicity is often associated with weakness, increased deep reflexes, and diminished superficial reflexes. It arises as a result of upper motor neuron lesion (Dharmil, 2007).

Management of drooling can be broadly divided into surgical and non-surgical approach. Surgical technique involves either the transplantation of parotid duct, the removal of salivary gland, sectioning of chorda tympani and tympanic nerve or combination of these procedures. Non-surgical includes pharmacological therapy, radiotherapy, oral motor therapy and behavior therapy. Pharmacological therapy includes anticholinergics, scopolamine, benzotropine and glycopyrolate. Botulinum toxin A injection to salivary gland has been found to reduce drooling (Robert, 2013).

Oral motor therapy facilitates normal oral motor patterns. It uses different ways like brushing, tapping, stroking and vibration which are intended to improve jaw stability, mouth closure, increase in tongue mobility, strength, sensory awareness and decrease in hypersensitivity. The exercises are targeted to decrease drooling or loss of saliva out of oral cavity. Each exercise should be repeated several times using a mirror. Child must exert as much effort as possible to gain the maximum result from these exercises (Becker, 2002).

This study aims to assess the effect of oral motor stimulation on drooling among children with cerebral palsy.

1.1 Need for Study

Drooling occurs naturally in very young children, but as the child gets older it usually decreases. Daytime drooling stops within the first few years of life, although it is still normal for it to occur in the older child during sleep. Daytime drooling beyond the age of about four years is unusual, unless there is an underlying medical problem, such as CP (Kervin, 2005).

The present total population of children in the world is 7 billion. In India, 31 percent of the population is children (Census, 2012). The incidence of cerebral palsy is 1.2 to 4 cases per 1000 live births in which, 10-13% of children have drooling (CDC, 2013). The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, behavior, epilepsy and secondary musculoskeletal problems**.**

Oral motor and oral sensory issues are frequently observed in children with cerebral palsy. Delay in feeding, failure to thrive, management of oral secretions, phonological and articulation development is often impaired. This occurs due to deficits in sensory, neuromuscular systems of oral mechanism and postural control (Becker, 2010).

Drooling is considered as a normal physiological phenomenon till the age of 18-24 months beyond which, it is considered abnormal. Prevalence rate of drooling in cerebral palsy is approximately 58%. Of these, 27.7% are moderate to severe. It may occur due to poor oral motor abilities, poor oral sensation and dysphasia. Studies have shown three major causes of drooling in CP. These are incomplete lip closure, low suction force and delay in suction and propelling of food. Drooling causes irritation of facial skin, perioral infections, unpleasant

odour and aspiration pneumonia, problems with eating, speech and ineffective communication. The consequence of drooling may be social isolation, low self-esteem and hampered interpersonal relationship. It basically causes participation restriction in these children (Rottevel, 2009).

Contrary to what many people think, producing an excess amount of saliva does not usually cause drooling. Instead, it has been found that children who drool usually have a tendency to swallow less often than normal. In cerebral palsy, drooling is typically related to deficiencies in swallowing, difficulties moving saliva to the back of the throat, to poor mouth closure, jaw instability and tongue thrusting. Drooling can be made worse by a lack of head control and poor posture, lack of sensation around the mouth, mouth breathing, excitement and impaired concentration (Vandenhoggen, 2009).

Sajjinkumar (1998) conducted a study related to the effect of oral motor stimulation on drooling among children with cerebral palsy. The subjects were selected as and when they reported to department of occupational therapy for intervention. The subjects were selected according to purposive sampling technique. Total of 25 samples were allocated to experimental group. A pre assessment was done by using drooling quotient. Oral motor therapy was administered to the child by the researcher for 30 minutes daily for a period of 4 weeks to each child. The post test was done by using same scale and the result revealed that there was a significant reduction in drooling. There was a significant difference in drooling frequency and severity after a 4 week therapy.

The researcher during her visit to special schools has observed children with cerebral palsy. Majority of the children have drooling. Thus the researcher decided to provide an intervention which will reduce drooling. Keeping this need in mind, the researcher reviewed different non-pharmacological interventions for reducing drooling. With the support of the above literature and by understanding the benefits of oral motor stimulation, the researcher was interested to assess the effectiveness of oral motor stimulation on drooling among children with cerebral palsy.

1.2 Statement of the Problem

Effect of Oral Motor Stimulation on Drooling Among Children with Cerebral Palsy at Selected Centres in Coimbatore.

1.3 Objectives

1.3.1 To Assess the Level of Drooling in Children with Cerebral Palsy.

1.3.2 To Assess the Level of Drooling after Oral Motor Stimulation.

1.4 Operational Definition

1.4.1 Effect

It refers to the outcome which is reduction in drooling as a result of oral motor stimulation, measured by the Drooling Quotient scale.

1.4.2 Oral Motor Stimulation

It is an intervention done around the oral cavity for controlling drooling in children with cerebral palsy. It includes four interventions like applying pressure, tapping, stroking and stretching the mouth for a duration of twenty minutes for one month.

1.4.3 Drooling

It is an involuntary loss of control over saliva which results in saliva dripping out of the mouth as measured by Drooling Quotient.

1.4.4 Children

It refers to children between the age group of 6-12 years, diagnosed to have cerebral palsy with drooling, at Amrit centre for special needs and Women volunteer service (WVS) special schools.

1.4.5 Cerebral palsy

It refers to children who are clinically diagnosed with cerebral Palsy, and having drooling.

1.5 Hypothesis

H_1-There is a significant difference in drooling quotient among children with cerebral palsy before and after administering oral motor stimulation

1.6 Conceptual Framework

The conceptual frame work used for the study is based on General system theory. The basic concepts of general system theory were proposed in the 1950's. Ludwig Von Bertalanffy (1968) introduced System Theory as a universal theory that could be applied to many fields of study. Nurses are increasingly using System Theory to understand not only biological system but also systems in families, communities, nursing and health care. General System Theory provides a way of examining interrelationships and deriving principles.

A system is a set of interacting identifiable parts or components and it depends on the quality and quantity of its input, throughput, output and feedback. Input consists of information, material or energy that enters the system. After the input is absorbed by the system, it is processed in a way useful to the system. This information is called throughput. Output from a system is energy, matter or information given out by the system as a result of its processes. Feedback is the mechanism by which some of the output of a system is returned to the system as input. Feedback enables a system to regulate itself by redirecting the output of a system back into the system as input, thus forming a feedback loop. (Kozier & Erb 2008).

1.6.1 Input

In the present study, input begins with establishing a therapeutic relationship among children with cerebral palsy. In this phase, the researcher identifies children with drooling and collects the necessary information regarding demographic data such as age, sex, education status of mother and father, antenatal history, type of delivery, birth weight, physical examination findings, IQ level, and communication ability of the child. The drooling scores of the cerebral palsy children are assessed using Drooling Quotient.

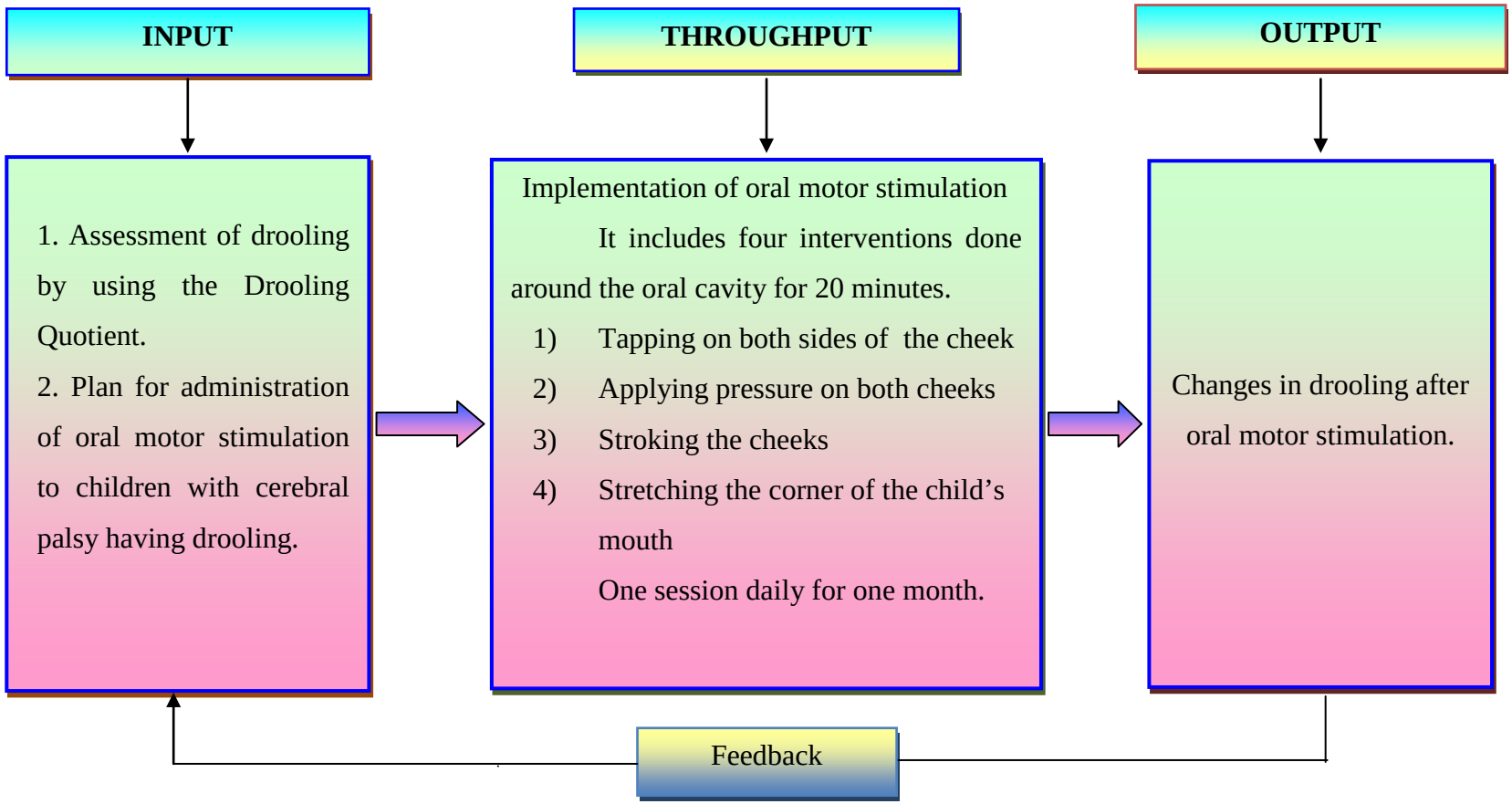
1.6.2 Through put

This phase includes implementing the oral motor stimulation for 20 minutes with four procedures, like tapping, stroking, stretching the corner of mouth and applying pressure for 5 minutes each.

1.6.3 Output

The output consists of evaluating the effect of oral motor stimulation on drooling among children with cerebral palsy by using Drooling Quotient.

Figure 1.1 : Conceptual Framework Based on General System Theory by Ludwig Von Bertalanffy



Source: Kozier & Erb (2008)

1.7 Projected Outcome

Oral motor stimulation will decrease drooling among children with cerebral palsy.

REVIEW OF LITERATURE

Thorough literature review will assist the researcher with the selection and development of the theoretical and methodological approaches to the problem. The researcher has reviewed various literature and research articles that are presented in this chapter. The literature review is discussed under the following headings.

2.1 Literature related to drooling among children with cerebral palsy

2.2 Literature related to oral motor stimulation

2.3 Literature related to oral motor stimulation on drooling among children with cerebral palsy

2.1 Literature Related To Drooling Among Children with Cerebral Palsy

Aggarwal (2012) conducted a study to investigate the effect of kinesiotape application in children with Cerebral Palsy (CP). The main objective of the study was to estimate the drooling quotient before and after kinesiotape application. The children were selected according to convenience sampling technique. Thirty samples were selected for this study. Drooling was assessed by using drooling quotient before and after kinesiotape application. The result revealed that standard deviation before treatment was greater than the standard deviation after treatment. The study concluded that the intervention helps to reduce drooling.

Susan and Ledker (2009) developed the drooling impact scale in order to measure the impact of drooling on lives of children with cerebral palsy. The correlation coefficient was 0.69 ($p<0.001$). The test retest reliability was found to be 0.85 (standard error 0.05). The mean group difference of 23.5 (95% confidence interval) were obtained.

Carlstedt et al (2001) conducted a study to find out the effect of elastic tape application on four year old patients with cerebral palsy suffering from excessive drooling. The tape was applied to the child's chin. The parents received the three questionnaires referring to drooling frequency. The first was to be answered before applying the tape, second was to be answered after four weeks of daily tape application and third was to be after 3 months. The drooling frequency had decreased from constant drooling to frequent drooling.

Barikatte (2012) stated that, drooling which is known as ptyalism can be defined as salivary incontinence or involuntary spillage of saliva over the lower lip. Drooling could be caused by excessive production of saliva, inability to retain saliva within the mouth or problem with swallowing. The physical and psychosocial complications include maceration of skin around the mouth, secondary bacterial infections, bad odour, dehydration and social stigmatization. People with drooling problems are also at increased risk of inhaling saliva, food and fluid into the lungs.

Milton (2006) in their article on therapeutic intervention for tone abnormalities in CP stated various interventions that help in reduction of spasticity of muscle. The treatments include:

- Physical and occupational therapy
- Oral medications
- Botulinum toxin injection
- Phenol injections
- Intrathecal baclofen
- Selective dorsal rhizotomy and
- Orthopaedic surgery

Thamassebi and Mejcurson (2003) conducted a study to compare and evaluate the different methods which have been commonly used to reduce drooling. The researcher selected five centers in United Kingdom that carried out some form of treatment to control drooling. Thirty seven cerebral palsy children within 3-18 yrs of age participated in this study. The data was collected using a detailed questionnaire. Results showed that the most common management used in these five centers were surgical and medical management.

Lespargot and Nelson (2004) studied swallowing disturbances associated with drooling in children with cerebral palsy. He concluded that the oral stage of swallowing was affected in these children. The difficulty was due to incomplete lip closure during swallowing, low suction pressure and prolonged delay between the suction and propelling stage. According to him, children who drooled did not have any abnormality in the propulsion of liquid towards the pharynx.

Vanderburg et al (2001) conducted studies to find out the relationship between drooling and quality of life of children and parents. In these studies, he stated that children who drool experience problems with social interaction, neglect and low self esteem. They found improvement in the physical appearance, socialization and acceptance of the child. They concluded that, effective management of drooling could reduce frequency of wiping the child's mouth, changing bibs and damage to electronic device there by making quality of life of parents and child better.

Rapp (1980) observed children with cerebral palsy (CP) who suffered from drooling. They were conditioned to control their oral secretions using electronic devices. He observed these children during two activities of daily living. In his study, “string of dribble” was evaluated at 40 moments. Each session lasted for 10 minutes. Drooling Quotient was used to measure the severity of drooling. There was a significant difference in drooling severity after five months of therapy. Post test was done by using same scale and the result revealed that there was a significant reduction in drooling.

Cryscade (1992) conducted a study to find out the effect of oral appliances on the management of drooling. Oral motor therapy was applied on children over 8yrs of age who had moderate drooling. Pretest and post test was done by using drooling quotient. He concluded that, oral appliances have been used successfully in the management of drooling, chewing and swallowing dysfunction in children with CP.

Brandis et al (1987) conducted the study to check the effectiveness of oro facial regulation therapy on drooling. Seventy cerebral palsy children between 4-14 yrs of age participated in the study. Therapy was given for 15 months. Appliances of therapy showed a reduction of drooling in 40 children who had severe drooling.

Swannyvyskit and Bladden (1986) conducted a study on attempts to eliminate drooling in children with cerebral palsy. Drooling primarily results from an overflow of saliva from the mouth due to dysfunctional voluntary oral motor activity, improper swallowing, and oral sphincter deficits and rarely from hypersalivation. A study was undertaken to determine typical orofacial electromyographic patterns and swallowing frequencies of normal children and children with cerebral palsy with oral involvement who do, and who do not drool,

as well as to determine the correlation between swallowing frequency and drooling rate. Results showed that, drooling in the pediatric cerebral palsy population was caused by both inefficient and infrequent swallowing.

Damayanti and Makati (2002) conducted a study to investigate the effect of behaviour therapy technique for controlling drooling in children with cerebral palsy associated with mild intellectual disability. A total number of 25 children with cerebral palsy associated with mild intellectual disability attending the occupational therapy department of Swami Vivekananda National Institute of Rehabilitation Training and Research (SVNIRTAR), Orissa, India, participated in a single blind randomized pre and post test control group training study. The subjects were randomly allocated to group A (experimental n=12) and group B (control n=13). Two independent raters observed baseline frequency of drooling for 20 minutes for both the groups. After the baseline data collection, subjects in group a received conventional therapy along with behaviour therapy (token economy) and group B received conventional therapy alone.

The result showed that there was a significant decrease in frequency of drooling after application of token economy as a behaviour modification technique in the experimental group ($p = 0.001$) as compared to the control group ($p = .070$). The study concluded that, the token economy program was effective in controlling drooling in children with cerebral palsy associated with mild intellectual disability.

Herne et al (1996) examined the effect of antireflux medication on drooling of patients with cerebral palsy based on the hypothesis that acid reflux in the distal portion of esophagus may induce saliva and result in drooling. In this, patients were given either combination of two antireflux medications or placebo.

Drooling was measured by using drooling quotient. No significant difference between groups ($p = 0.74$) was found. Researcher concluded that anti reflux medications do not have significant decrease in drooling.

Franklin et al (1987) conducted a study related to the prevalence of malocclusion in children with cerebral palsy. The study aimed at studying the perioral activities of 14 CP patients with intraoral observations. Drooling was associated with poor motor function. Researchers thus far have determined that children who drool have increased difficulty forming a bolus, reduced lip competence, slightly less intraoral suction and more oral residue after swallowing. Significant negative correlations have been found between drooling and sucking ability, drooling and chewing ability, drooling and swallowing. Significant positive correlations have been found between drooling and poor head control, reduced ability to voluntarily control the lips, reduced ability to voluntarily control the tongue, and reduced ability to voluntarily control the jaw. Malocclusions and poor orbicularis muscle coordination was also associated with drooling.

Tahmassebi and Mejcurson (2003) conducted a study on CP children with drooling. Physiological studies have suggested that there are problems in the initial stage of swallowing in cerebral palsy, but no study appears to have investigated whether hyper salivation is also involved. Ten cerebral palsy children with severe drooling problems were compared with 10 matched controls who had no mental or physical disabilities. In those children, drooled saliva was collected through a cup with attached tube, with no restriction on talking and jaw movement. Mean salivary flow rates per minute were 22 ml for CP and 33 ml for controls ($p = 0.053$) and buffering capacities were similar. The flow rates showed no hyper salivation in the cerebral palsy group, though the interesting possibility arises that a larger group might have had a significant hypo salivation effect.

Liselott (2009) conducted a study to investigate the difference in amount of drooling in children with cerebral palsy, in general and in subtype. Saliva was collected from 61 healthy children who drooled. The method of collection was swab saliva collection method. The intensity of drooling was assessed by drooling quotient. No difference was found in flow rates, age, and sex among CP children who drooled. Flow rate of diskinetic cerebral palsy results differed statistically from those of healthy children.

Neverlienmodum (2005) published an article related to treatment of drooling in cerebral palsy. Conservative treatment such as physiotherapy, orofacial regulation therapy, pharmacotherapy and different surgical methods are reviewed and the degree of success discussed. The need for thorough medical and neurological examination and teamwork approach was emphasized. The findings revealed that, after proper medical examination and correction of aggravating factors, conservative treatment should be initiated at the earliest possible age, including the use of oral prosthetic appliances.

Becmeur (2013) conducted a study on, surgical management of cerebral palsy children with drooling. Thirty one patients between the age group of 5-24 years participated in this study. All patients underwent surgery on parotid duct. The results were evaluated according to the frequency of residual drooling and the Thomas Stonel and Greenberg classification. The results show that there was significant reduction of drooling after the simple surgical procedure on submandibular ducts.

2.2 Literature Related To Oral Motor Stimulation

Amjoccupther (1990) conducted a study related to decreasing drooling with oral motor stimulation. Many persons with severe and profound disabilities exhibit chronic and excessive drooling, which can have unfavorable effects on their socialization and health. Few treatments to reduce this behavior, however, have been evaluated systematically. In the present investigation, oral motor stimulation was used on two children who attended a residential educational facility for students who are blind and who have multiple disabilities. The treatment involved the brushing of the hard palate, the upper and lower gums, the tongue, and the inside of both cheeks at one hour intervals during the day time. The drooling was assessed by using Thomas stonel and Greenberg scale. The results showed a reduction of drooling in cerebral palsy children.

Cecilliefmanno (2005) in his article stated that, children with developmental delay often have feeding difficulties resulting from oral motor problems. Based on both clinical experience and review of published studies, oral motor intervention has shown to be effective in improving the oral function of preterm babies and children with neuromotor disorder, such as cerebral palsy.

Beckman (1998) published an article related to oral motor stimulation in which, the author explained that, humans seek oral stimulation by the third month of gestation. The infant first finds this oral input from the amniotic fluid as the fetus sucks and swallows in the womb. The fetus also has been seen on ultrasound images placing the thumb into the mouth. The pressure and movement within the oral cavity tell the brain where the mouth begins and ends. Without such input, the

location and boundaries of the mouth are uncertain to the infant. Movement against resistance is the best way to build strength. Repetition of movement is the best way to refine and develop muscle control. At birth, the infant frantically searches for something, preferably the breast, on which to suck. It is a reflexive pattern to ensure nutritional intake. The mouth is equipped with lots of sensory receptors, ready for and craving stimulation. Since vision is not yet well developed, the mouth is the place for touch, taste, texture, with the added bonus of smell accompanying the oral experience. Anything that can fit into the mouth is accepted for exploration. As the infant matures, discrimination of edible from non-edible items develops.

Hayran (2010) conducted a study to investigate the effects of physiotherapeutic treatment consisting of electrical stimulation, exercises and proprioceptive neuromuscular facilitation (PNF) applied to orofacial area on drooling in children with spastic cerebral palsy. The study consisted of 15 children with spastic cerebral palsy who were identified to have severe drooling. Salivary flow rate was measured in each session using drooling quotient (DQ). Each patient received eight therapy sessions with two sessions per week. There was a statistically significant decrease in the rate of salivary flow rate in post-treatment period when compared with pre-treatment observations ($p<0.01$).

Stephenine (2014) conducted a study to encourage imitation skills in children because children learn and practice by imitating their models. As adults, we model various gross motor, fine motor, and oral motor skills throughout the day to encourage our children to imitate us, and before long, they begin to carry out those skills spontaneously. Purposive sampling method was used for this

study. Oral motor exercises may be implemented into the child's therapy program for various reasons, whether it is to increase muscle tone or strength, stability, movement, or to increase overall awareness for feeding and speech production. Often times, these types of activities are recommended to build the child's awareness of his mouth and how his tongue, teeth, lips, and jaw work together to produce speech sounds and words. Children can be easily stressed or defensive when a hand or object is presented to their lips or mouth, especially when demands are placed on them to participate in something that is uncomfortable or difficult for them, such as oral motor activities. The drooling was assessed by using Drooling Quotient and therapy was given for six months. Result showed that, there was a statistically significant decrease in the rate of salivary flow in post treatment period when compared with pre treatment observations.

Kerwin (1999) states that oral motor problem in children are easy to recognize when the child coughs and chokes while eating. However the majority of the feeding problem present initially in more subtle ways such as, difficulty in introducing spoon feeding or advancing texture and limitation in the variety of food accepted.

Omarack and Sisson (1990) conducted a study related to the effect of oral motor stimulation on drooling among children with cerebral palsy. The intervention used was brushing of the hard palate, the upper and lower gums, the tongue, and the inside of both cheeks at one hour during the school day. The drooling quotient was used to measure the severity of drooling. The post test was done after 6 months. Results revealed that, there was a significant reduction in drooling after therapy.

Cisplatrin and Sniffen (2009) in their article stated that, drooling is the overflowing of saliva from the mouth. It is mainly due to neurological disturbance and less frequently due to hyper salivation. Drooling can also lead to functional and clinical consequences for patients, families, and caregivers.

Mugayar (2009) states that, oral motor function disorder such as feeding problem occurs frequently in children with neurological impairments. Common parenteral complaints include, poor sucking, difficulty in drinking liquids, difficulty in biting or chewing solids, coughing and choking. Oral motor therapy may include many home based exercises to reduce drooling and improving feeding skill.

2.3 Literature Related To Oral Motor Stimulation and Drooling Among Children with Cerebral Palsy

Seraynuralsigan (2013) conducted a study on the effect of oral motor stimulation on drooling among children with cerebral palsy. Oral motor assessment form and Bayle scale of infant development were used to evaluate the oral motor function during the initial examination and six months later. Eighty one children aged 12 to 42 months were included in this study. One hour oral motor therapy was given for children. The duration of the study was six months. Results revealed that, oral motor stimulation helps in reducing drooling.

Whiteman (2010) conducted a study related to the effect of oral motor stimulation on drooling among children with cerebral palsy. The subjects were selected according to purposive sampling technique. Total of 12 samples were allocated to experimental group. A pre assessment was done by using drooling

quotient. Oral motor therapy was administered to the child by the researcher for 30 minutes daily for a period of 4 months to each child. There was a significant difference in drooling frequency and severity after a 4 months therapy. The post test was done by using the same scale and the results revealed that, there was a significant reduction in drooling.

METHODOLOGY

The present study was designed to evaluate the effect of oral motor stimulation on drooling among children with cerebral palsy. This chapter represents the overall plan of research process and deals with description of the research approach, design, setting, population, criteria for sample selection, sampling technique, development and description of tool, procedure for data collection and plan for data analysis.

3.1 Research Approach

Quantitative experimental research approach was adopted for the present study. In this approach, the researcher manipulates the independent variable, and controls and measures any change in the dependent variable.

3.2 Research Design

The present study was designed to assess the effect of oral motor stimulation on drooling among children with cerebral palsy. In order to achieve the objectives, the researcher adopted pre experimental one group pre test-post test design. It follows the basic experimental design, but fails to include control group and randomization.

3.3 Setting

The study was conducted at Amrit centre for special need and Women Volunteer Service (WVS) special school, managed by private organizations located at Kavundampalayam. The total strength of both schools were 109 and 49 respectively. Both the schools provide education to special children with mental retardation, autism, cerebral palsy, learning disabilities and attention deficit hyperactivity disorder. As a routine rehabilitation training, vocational therapy, and occupational therapy are rendered every day in the centers.

3.4 Population

The target population was children with cerebral palsy between the age group of 6-12 yrs. The total number of children in Amrit Center for Special Needs was 40, and the total number of children in WVS was 25. Hence the accessible population was 65 children, attending both Amrit and WVS special school.

3.5 Sampling

The target population was children with cerebral palsy studying in the special centres. In Amrit, there were totally 40 children with cerebral palsy. The investigator assessed the severity of drooling by using Drooling Quotient. It showed that 15 children had drooling. In Women Volunteer Service special school, there were totally 25 children with cerebral palsy. The investigator assessed the severity of drooling by using Drooling Quotient. It showed that 10 children had drooling. Thus, in both the centres 25 children were selected by using purposive sampling method.

3.6 Criteria for Sample Selection

The samples were selected based on the following inclusion and exclusion Criteria.

3.6.1 *Inclusion criteria*

a. Children with cerebral palsy having drooling.

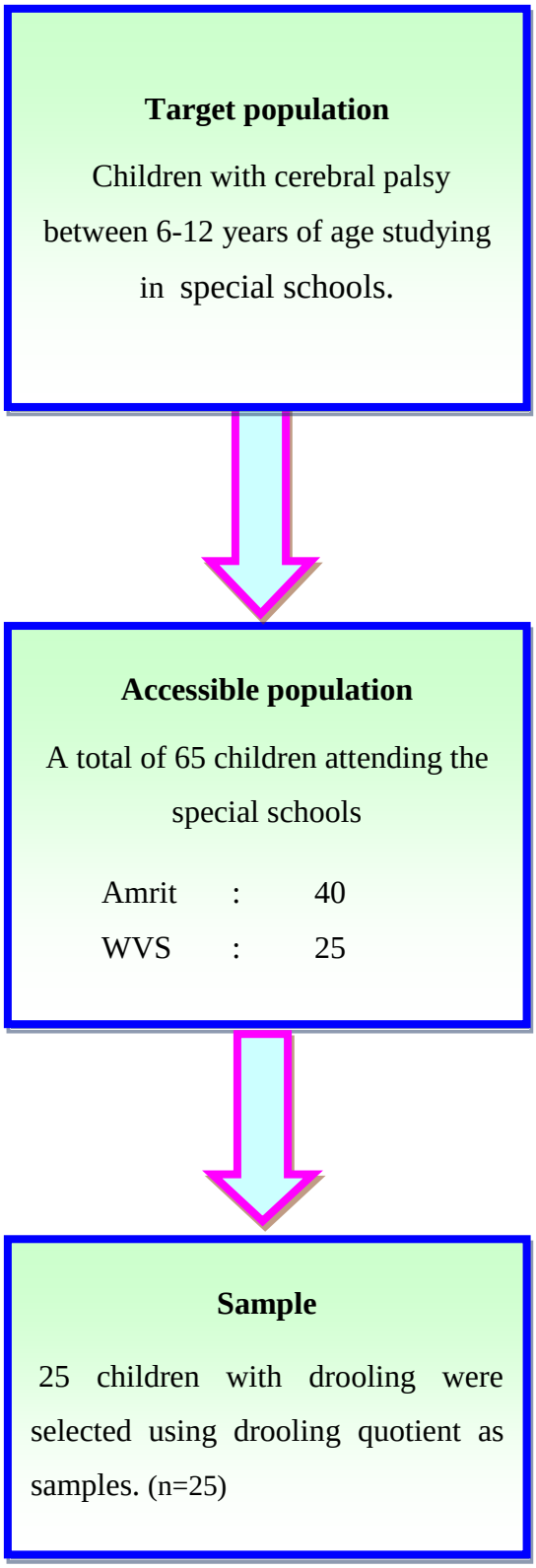
3.6.2 *Exclusion criteria*

a. Children who are not able to cooperate.

b. Children with cerebral palsy and associated deafness or blindness.

c. Children with cerebral palsy having cleft lip or cleft palate.

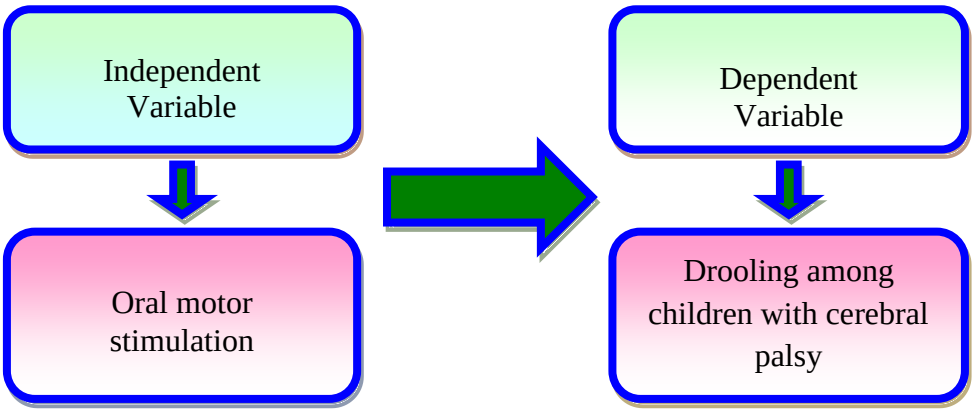
Figure 3.1: Schematic Representation of Sampling Process



3.7 Variables of the Study

The Independent Variable in the Present Study was Oral Motor Stimulation and Dependent Variable was Drooling among Children with Cerebral Palsy.

Figure 3.2 : Schematic Representation of Variables



3.8 Tool for Data Collection

The following materials were used for the study.

3.8.1 Interview Schedule to Collect Demographic Profile

This includes age, sex, religion, education status of mother, education status of father, antenatal and intra natal history, neonatal history and physical examination of children with cerebral palsy.

3.8.2 Drooling Quotient

R.T. Sheffer developed this drooling quotient as an objective measurement used to document the degree of improvement by using the Drooling Quotient. Drooling was observed and scored during two periods of 10 minutes separated by a 30 minutes break. The presence or absence of drooling was evaluated at every 15 seconds interval over a 10 minutes period (40 observations).

$$(DQ)\ (\%) = \frac{\text{No. of drooling episodes}}{\text{40 observations (in a 10 minute period)}} \times 100\%$$

3.8.3 Oral Motor Stimulation

Oral motor stimulation refers to stimulation of muscles of face for strength and coordination. It was first introduced by Beckman in 1986. For chewing and swallowing, children need to have the right amount of strength, range of motion and coordination. In this study, the researcher selected four interventions like applying pressure, tapping the cheeks, stretching the mouth and stroking of the cheeks. Total duration of the procedure was twenty minutes.

Preparation of child

Child was seated on a cerebral palsy chair with cut out lapboard to keep the trunk upright, shoulders and arms should be rested forward on the lap board, the hips and knees are flexed to 90 degree, ankles in 90 degree and feet firmly rested on the foot rest.

Procedure

Pressure

- Initially, deep and firm pressure is to be applied on both cheeks towards the lip for 10 times.
- Rhythmic downward pressure is to be applied with researcher's finger in the middle of the tongue for 10 times.
- Pressure is applied on the lower jaw for 10 times.
- Finally, pressure is applied over lower lip for 10 times.

Tapping

- Slow rhythmic tapping of both side of the cheeks, outer side of upper and lower gums is to be done for 5 times.

Stroking

- Deep and firm pressure is applied by researcher, using downward bilateral strokes on cheeks towards the lip for 5 times.

Stretching

- The corner of the child's mouth is to be stretched by the researcher for 5 times.

3.9 Pilot Study

The pilot study was conducted to check the feasibility, practicality, validity and reliability of the tool. The study was conducted at Aashirwaad School for special needs for a period of 10 days. There were 20 children having cerebral palsy. Pre assessment was done by using drooling quotient. There were 15 children having drooling. Based on the inclusion and exclusion criteria, the investigator selected 10 samples for this study. Oral motor stimulation was given for a duration of twenty minutes once daily for 10 days and the intervention lasted for 20 minutes. There were six interventions like tapping, pressure, stretching, stroking, candle blowing and whistling were included in the study. Post test was conducted based on the same scale and the result revealed a significant reduction in drooling after administration of oral motor stimulation.

Among these ten children, only five members were able to do candle blowing and whistling. The other children had difficulty in doing these two interventions. Hence, candle blowing and whistling were not included in the interventions during the main study by the researcher after approval by the dissertation committee.

3.10 Procedure for Data Collection

The main study was conducted to meet the objectives. The study was conducted at Amrit centre for special needs and Women Volunteer Service School (WVS), managed by private organizations located at Kavundampalayam, Coimbatore for a period of 30 days. There were twenty five children included in this study. A pre assessment was done by using drooling quotient scale for the children with cerebral palsy having drooling. Oral motor stimulation was administered to the child by the researcher for a duration of 20 minutes once daily for a period of one month. The post test was done using the same tool at the end of the thirtieth day.

3.11 Technique of Data Analysis and Interpretation

The frequency tables were formulated for all significant information. Descriptive and inferential statistical method was used for data analysis. Descriptive statistics was applied for the analysis of demographic variables. The mean and standard deviation were used to describe the characteristics and paired ‘t’ test was used to find out the significance of Oral motor stimulation on drooling among children with cerebral palsy.

Chi-Square test was used to find out the association between selected demographic variables on drooling among children with cerebral palsy.

3.11.1 Paired ‘t’ test

Paired ‘t’ test was used to find out the significance of oral motor stimulation.

$$t = \frac{\bar{d}}{SD}\sqrt{n}$$

$\bar{d}$ = Mean of difference

SD = Standard deviation

n = Number of samples

3.11.2 Chi-Square test (with Yates correction)

Chi-Square test was used to find out the association between selected demographic variables on drooling among children with cerebral palsy.

$$\chi^2 = \sum \frac{[(O-E)-0.5]^2}{E}$$

Where,

O = Observed value in each category

E = Expected value in corresponding category

0.5 = Yates correction value

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and results of data, collected from 25 children with cerebral palsy. The aim of study was to determine the effectiveness of oral motor stimulation on drooling among children with cerebral palsy. The data gathered were analyzed and interpreted in the light of the objectives and hypothesis of the study. Descriptive and inferential statistics were employed to analyze the data. Frequency and percentage were used to represent the demographic variables and level of drooling was analyzed through mean and standard deviation. Paired 't' test was used to analyze the effect of oral motor stimulation on drooling among children with cerebral palsy. And the data obtained from the children with cerebral palsy are organized, analyzed and presented based on the following details.

SECTION I

Presentation of demographic variables of children with cerebral palsy.

SECTION II

Assessment of drooling quotient before oral motor stimulation among the children with cerebral palsy.

SECTION III

Assessment of drooling quotient after oral motor stimulation among children with cerebral palsy.

Effect of oral motor stimulation on drooling among the children with cerebral palsy.

SECTION IV

Association between selected demographic variables on drooling among children with cerebral palsy.

SECTION I

4.1 Presentation of Demographic Variables

This section deals with the distribution of participants according to their demographic characteristics. The obtained data on demographic variables is described under the sub headings, which includes age, gender, religion, parent's educational status, mother's antenatal and intra natal history, neonatal history and physical findings of the child. Data was analyzed using descriptive statistics and are summarized in terms of frequency and percentage.

Table 4.1
Frequency Distribution of Children Based On Their Age in Years

n=25

S. No	Age in Years	No. of Participants	
		Frequency	Percentage (%)
1	6-8yrs	14	56
2	8-10yrs	6	24
3	10-12yrs	5	20

The above table shows the distribution of 25 children based on their age. It was found that 14 (56%) children were within the age group of 6-8 yrs, 6 (24%) children were within the age group of 8-10 years and 5 (20%) children were within 10-12yrs. (Figure 4.1)

Table 4.2

Frequency Distribution of Children Based On Their Gender

n=25

S. No	Gender	No. of Participants	
		Frequency	Percentage (%)
1	Male	13	52
2	Female	12	48

The above table depicts that 13 (52%) of them were males and 12 (48%) of them were females. (Figure 4.2)

Table 4.3

Frequency Distribution of Children Based on their Religion

n=25

S. No	Religion	No. of Participants	
		Frequency	Percentage (%)
1	Hindus	19	76
2	Christians	4	16
3	Muslims	2	8

Table 4.3 explains the distribution of children based on their religion and it was found that, 19 (76%) were Hindus, 4 (16%) Christians and 2 (8%) of them were Muslims. (Figure 4.3)

Figure 4.1

Distribution of Children Based on Their Age in Years

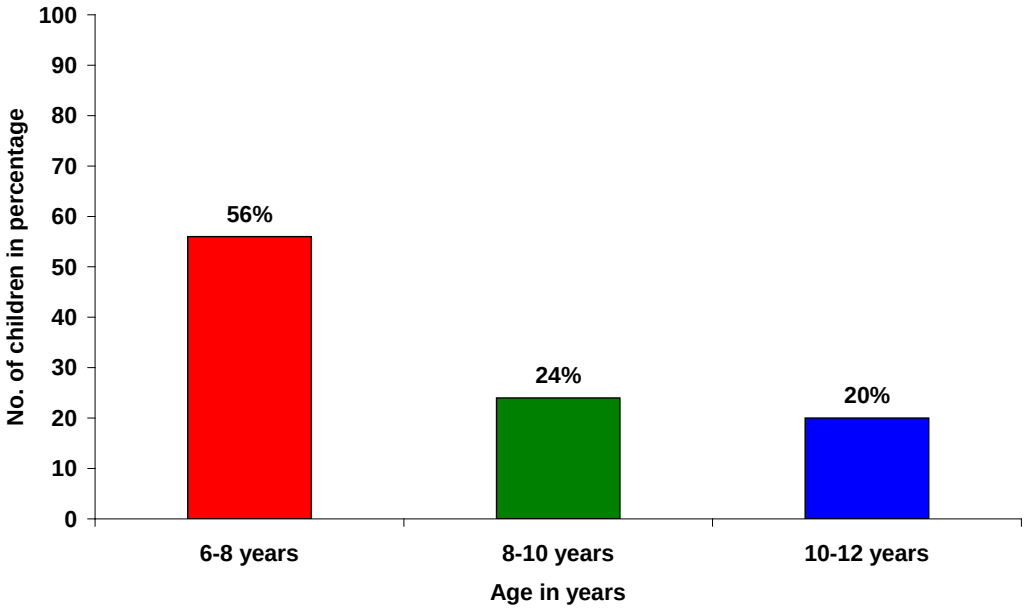


Figure 4.2

Distribution of Children Based on Their Gender

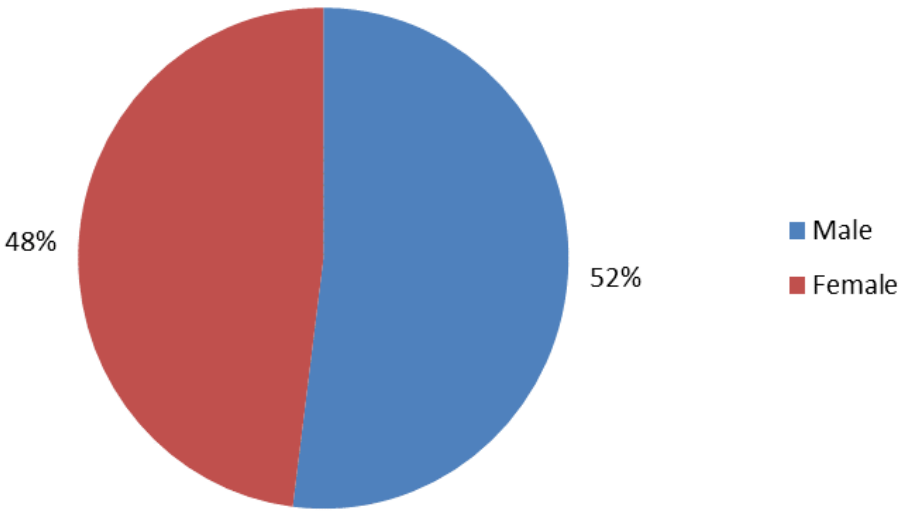


Table 4.4

Frequency Distribution of Children Based on their Father's Education

n=25

S. No	Father's education	No. of participants	
		Frequency	Percentage (%)
1	High school education	13	52
2	Higher secondary education	8	32
3	Graduate	3	12
4	Post graduate	1	4

The above table describes the educational status of father. It shows that fathers of 13 (52%) children had high school education, 8 (32%) of them had higher secondary education, 3 (12%) of them were graduates and 1 (4%) was a post graduate. (Figure 4.4)

Table 4.5

Frequency Distribution Of Children Based On Their Mother's Education

n=25

S. No	Mother's education	No. of Participants	
		Frequency	Percentage (%)
1	High school education	10	40
2	Higher secondary education	3	12
3	Graduate	8	32
4	Post graduate	4	16

The above table reveals that, 10 (40%) mothers had high school education, 3 (12%) of them had higher secondary education, 8 (32%) of them were graduates and 4 (16%) of them were post graduates. (Figure 4.5)

Figure 4.3

Distribution of Children Based on their Religion

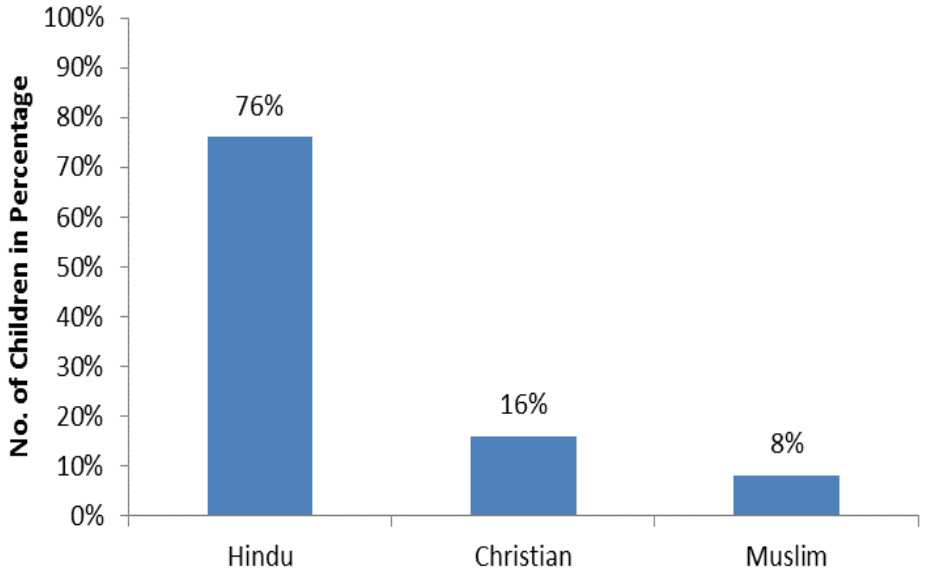


Figure 4.4

Distribution of Children Based on their Father's Education

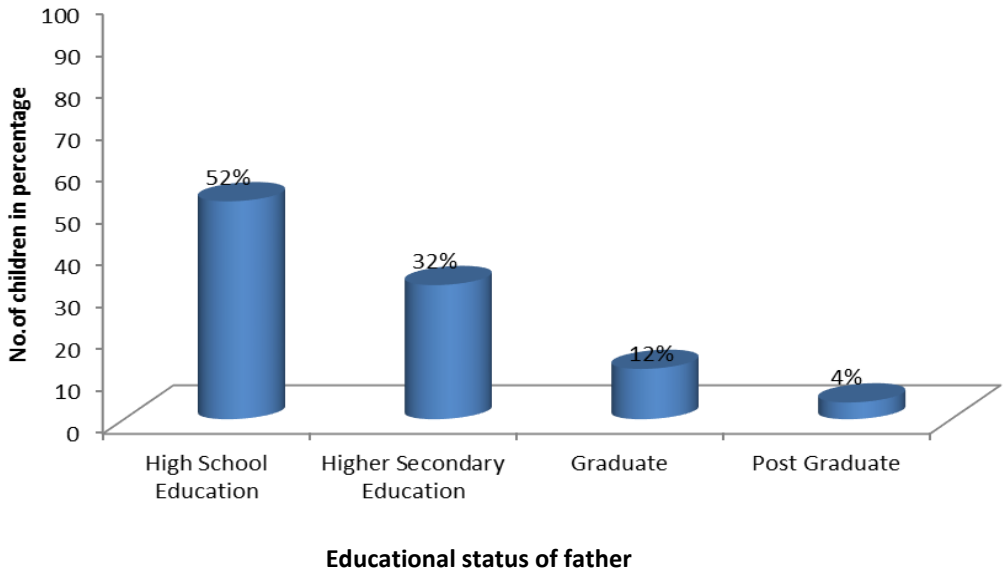


Figure 4.5

Distribution of Children Based on their Mother's Education

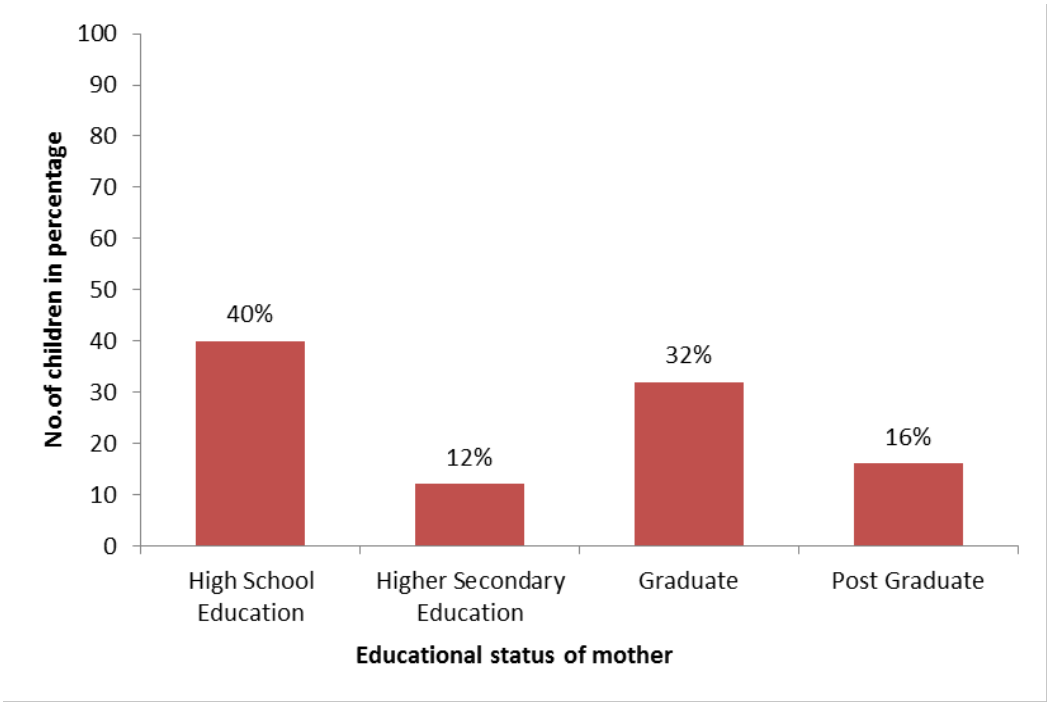


Table 4.6

Frequency Distribution Of Children Based On Their Mother's Antenatal And Intranatal History

n=25

S .No	Antenatal and Intra natal history	No. of Participants	
		Frequency	Percentage (%)
1	**History of prenatal problem** Present Absent	 4 21	 16 84
2	**History of prolonged second stage** Present Absent	 5 20	 20 80
3	**History of premature rupture of membrane** Present Absent	 7 18	 28 72
4	**Mode of delivery** Vaginal Instrumental Caesarian	 18 3 4	 72 12 16

The above table shows that 4, (16%) of the mothers had prenatal problems like gestational diabetes mellitus and pregnancy Induced Hypertension. Five (20%) of the mothers had a history of prolonged second stage and 7 (28%) had a history of premature rupture of membranes. Sixteen (72%) children were born by vaginal delivery, 3 (12%) were delivered by forceps and 4 (16%) children were born by caesarean section.

Table: 4.7

Frequency Distribution Of Children Based On Their Neonatal History

n=25

S. No	Neonatal history	No. of Participants	
		Frequency	**Percentage**
1	**Birth weight**		
	Below 2.5kgs	21	84
	Above 2.5kgs	4	16
2	**Cried immediately after birth**		
	Yes	3	12
	No	22	88
3	**Other problems in neonatal period**		
	Significant	23	92
	Nothing significant	2	8
4	**History of Stay in neonatal ICU**		
	Yes	5	20
	No	20	80

The data on neonatal history explains that majority, 21 (84%) of children were below 2.5 kg of birth weight and 4 (16%) of them had birth weight above 2.5 kg. Twenty two (88%) of them did not breath and cry immediately after birth. Majority 23 (92%) of them had significant problems in neonatal period and 5 (20%) of them were in neonatal ICU after birth.

Figure 4.6

Distribution of Children Based on their Ability to Close the Lips

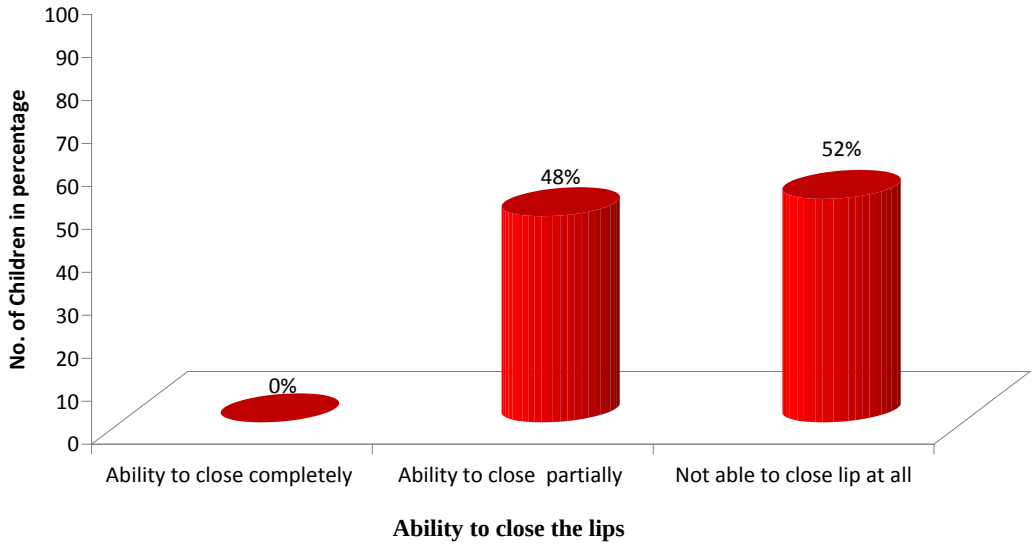


Figure 4.7

Distribution of Children Based on Their Ability to Communicate

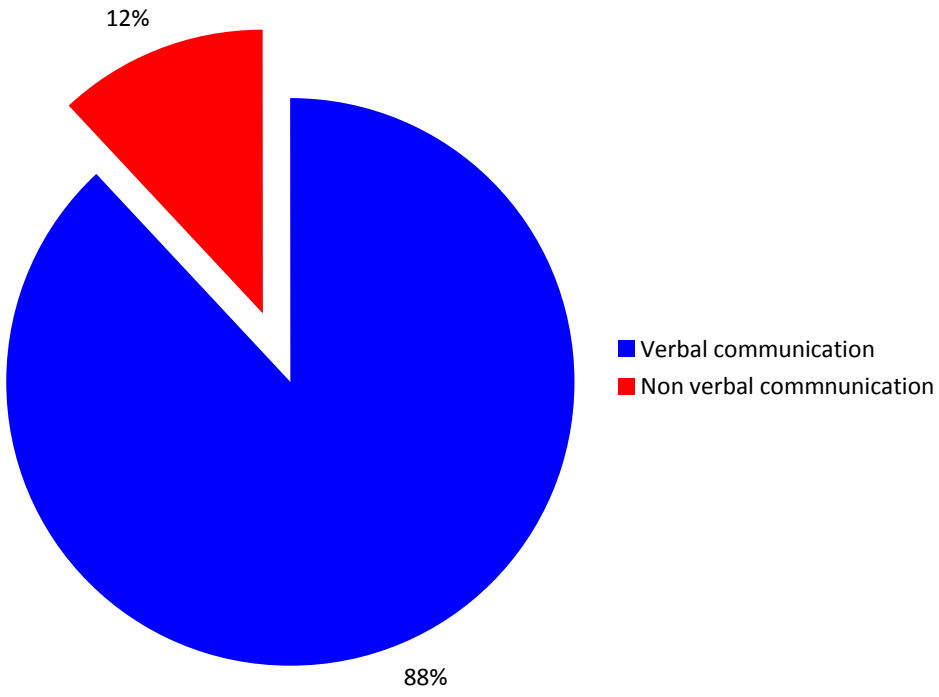


Table 4.8

Frequency Distribution of Children Based on their Ability to Close the Lips

n=25

S. No	Ability to close the lips	No. of Participants	
		Frequency	Percentage (%)
1	Ability to close the lips completely	0	0
2	Ability to close the lips partially	12	48
3	Not able to close lips at all	13	52

The above table reveals that, majority 13 (52%) of them couldn't close their lips and 12 (48%) children were able to close their lip partially. None of the children could close their lips completely. (Figure 4.6)

Table 4.9

Frequency Distribution of Children Based on their Ability to Communicate

n=25

S. No	Ability to communicate	No. of participants	
		Frequency	Percentage (%)
1	Verbal	22	88
2	Non verbal	3	12

The above table depicts that, majority, 22 (88%) of the children were able to communicate verbally and only 3 (12%) children were able to communicate nonverbally. (Figure 4.7)

SECTION II

4.2 Assessment of Drooling Quotient before Oral Motor Stimulation among Children with Cerebral Palsy

This section deals with the analysis and interpretation of pretest drooling score among children with cerebral palsy. The pretest drooling quotient was obtained and tabulated in the master data sheet and the total score obtained by each respondent was organized and analyzed using descriptive and inferential statistics.

Table: 4.10

Frequency Distribution of Drooling Quotient Before Oral Motor Stimulation

n=25

S. No	Pre test Drooling Quotient (%)	No of Participants	
		Frequency	Percentage %
1	60-70	1	4
2	70-80	9	36
3	80-90	7	28
4	90-100	8	32

This table shows the drooling quotient among cerebral palsy children before oral motor stimulation. It was assessed that drooling quotient between 60-70 % was identified in 4% of children and a majority of (36%) children had a drooling quotient between 70-80%.

SECTION III

4.3 Effect of Oral Motor Stimulation on Drooling among Children with Cerebral Palsy.

This section deals with the analysis and interpretation of posttest drooling score among children with cerebral palsy. The posttest and posttest drooling quotient was obtained and tabulated in the master data sheet and the total score obtained by each respondent was organized and analyzed using descriptive and inferential statistics.

Analyzed data were presented in the following headings:

1. Assessment of drooling quotient after oral motor stimulation.
2. Effect of oral motor stimulation on drooling among children with cerebral palsy.

Table: 4.11

Frequency Distribution of Drooling Quotient after Oral Motor Stimulation

n=25

S. No	Post test Drooling Quotient (%)	No of Participants	
		Frequency	Percentage %
1	60-70	0	0
2	70-80	5	20
3	80-90	20	80
4	90-100	0	0

Above table shows the drooling quotient among children with cerebral palsy after oral motor stimulation. It was assessed that drooling quotient between 80-90 % was identified in majority of (80%) of children and 20% of children had a drooling quotient between 70-80%.

Table 4.12

Effect of Oral Motor Stimulation on Drooling Among Children with Cerebral Palsy

n=25

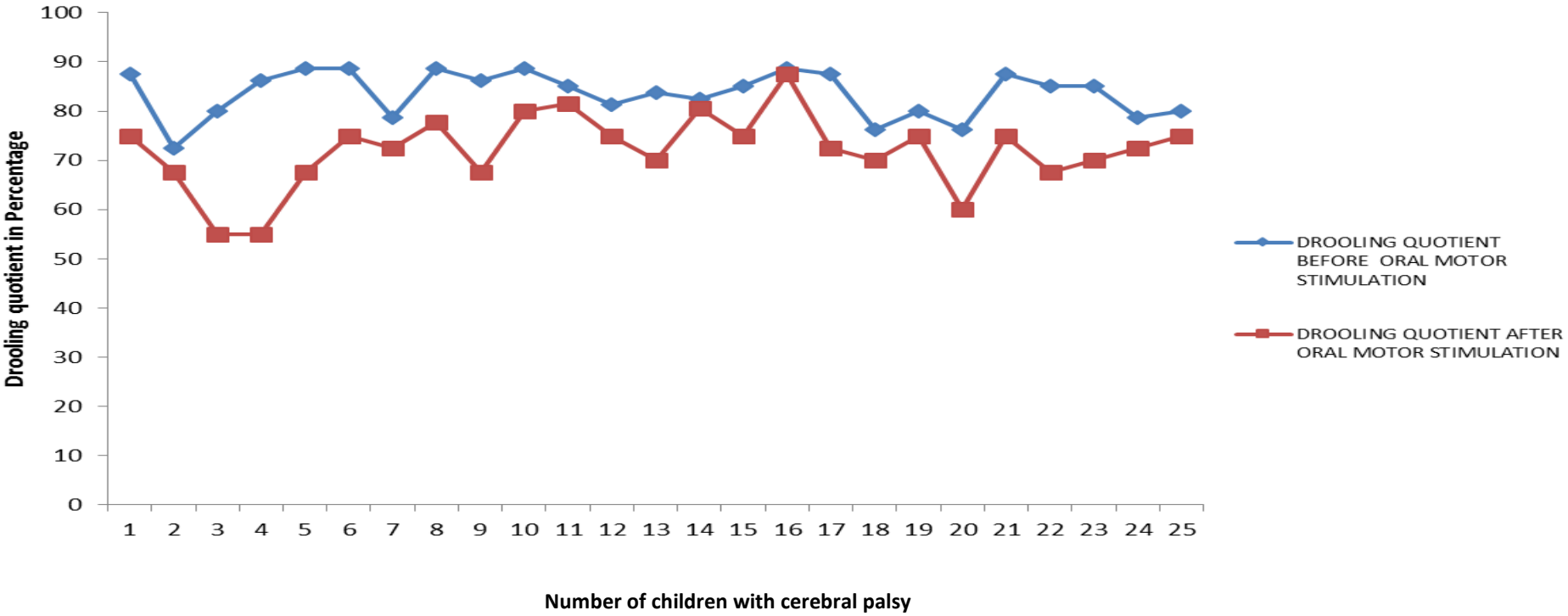
Test	Mean	Mean difference	Standard Deviation	't' Value
Before intervention	83.55	11.57	4.46	7.69***
After intervention	72.05		7.41	

***Significant at 0.001 level

The paired 't' test was used to assess the effect of oral motor stimulation on drooling among children with cerebral palsy before and after oral motor stimulation. It was identified that, the mean drooling quotient before and after oral motor stimulation was 83.55 and 72.05 respectively, with a standard deviation of 4.46 and 7.41 respectively. The mean difference was 11.57. The calculated 't' value was compared with the table value at 0.001 level of significance. It showed that, the calculated 't' value was greater than the table value. Thus the research hypothesis, 'There is a significant difference in drooling quotient among cerebral palsy children before and after administering oral motor stimulation', was accepted.

Figure. 4.8

Drooling Quotient among Children with Cerebral Palsy Before and after Oral Motor Stimulation



SECTION IV

4.4 Association Between Selected Demographic Variables on Drooling Among Children with Cerebral Palsy

Chi Square was used to find the association between the selected demographic variables and the pre test drooling quotient among children with cerebral palsy. The selected demographic variables were age, gender, birth weight, problems in neonatal period and the ability to close the lips by the children with cerebral palsy.

Table 4.13

Association between Selected Demographic Variables on Drooling among Children with Cerebral Palsy

n=25

S. No	Variable	Category	Frequency	Level of Drooling		χ^2 value (Yates correction)	df (c-1) (r-1)	Table value
				Less than mean	More than mean			
1	Age	6-8 years	14	8	6	11.99	2	9.21**
		8-10 years	6	4	2			
		10-12 years	5	3	2			
2	Gender	Male	13	8	5	0.1	1	3.84
		Female	12	8	4			
3	Birth weight	Below 2.5 kg	21	13	8	0	1	3.84
		Above 2.5 kg	4	2	2			
4	Other problems in neonatal period	Significant	23	10	13	0.2	1	3.84
		Nothing significant	2	0	2			
5	Ability to close lips	Ability to close lips partially	12	6	7	6.02	1	3.84*
		Not able to close lips at all	13	13	0			

*Significant at 0.05 level

** Significant at 0.01 level

Table 4.13 shows the association between the selected demographic variable and the level of drooling among children with cerebral palsy. It was found that chi square value obtained for age was 11.99 with degree of freedom 2 and table value obtained was 9.21 which was lesser than the calculated value. It is also found that the chi square value obtained for ability to close lips was 6.02 with degree of freedom 1 and table value obtained was 3.84 which was lesser than the calculated value. Hence it was proved that there was a significant association between drooling and age (at 0.01 level of significance) and also ability to close lips (at 0.05 level of significance) among children with cerebral palsy.

It was also identified that the other demographic variables like, gender, birth weight and problems during neonatal period were not associated with drooling among children with cerebral palsy.

RESULTS AND DISCUSSION

This chapter deals with the interpretation of the results and discussion of the findings. The study was conducted in Amrit centre for special needs and Women Voluntary School (WVS), managed by private organizations located at Kavundampalayam, Coimbatore for a period of 30 days. The main aim of the study was to assess the effectiveness of oral motor stimulation on drooling among children with cerebral palsy. Pre experimental one group pre test post test design was adopted in this study. There were 25 samples in this study. A pre assessment was done by using drooling quotient scale for the children with cerebral palsy having drooling. Oral motor stimulation was administered by the researcher for a duration of 20 minutes daily for a period of one month to each child. The post test was done using the same tool at the end of intervention. The pretest score and post test scores were compared. The findings are discussed under the following headings.

5.1 Demographic Variables of Children With Cerebral Palsy

In the present study 25 samples were randomly assigned. Age distribution revealed that 52% children were in the age group of 6-8 years, 40% were between 8-10 years and 8% were between 10-12 years. Lindeboom (2010) conducted an interventional study by providing oral motor stimulation on drooling among children with cerebral palsy between the age group of 6-12 years. The study findings revealed that oral motor stimulation helped in reducing drooling among children with cerebral palsy.

Gender distribution of children showed that, 52% of children were males and 48% were females. A study on effectiveness of oral motor stimulation as a common protocol on reducing drooling was seen in both male and female children.

Distribution based on religion showed that 76% of children were Hindus, 16% of them were Christians and 8% were Muslims.

Majority 52% of fathers had high school education, 32% of them had higher secondary education, 12% were graduates and 4% of them were post graduates.

It revealed that 40% mothers had school education, 32% of them were graduates, 16% of them were post graduates and 12% of them had higher secondary education.

Data on antenatal and intra natal history of mother revealed that, 16% of them had prenatal problems like gestational diabetes mellitus and pregnancy induced hypertension. Twenty percentage of them had prolonged second stage, 28% of them had the history of premature rupture of membrane present. Type of delivery shows that, majority 72% of children were born normally, 12% of them were delivered by forceps and 16% of children were delivered by cesarean section.

Neonatal history of children shows that, 84% of them were below 2.5 kgs birth weight and 16% of them had birth weight above 2.5kgs, 88% of them did not cry immediately after birth. Majority (92%) of the children could not initiate breast feeding immediately after birth and 5% of children were admitted to the Neonatal ICU.

Physical examination revealed that, 48% children were able to close their lips completely and majority (52%) were not able to close their lips completely. Assessment on ability to communicate shows that, majority (88%) of children were able to communicate verbally, and remaining 12% of children could not communicate verbally.

5.2 First Objective: To assess the level of Drooling Quotient before administration of oral motor stimulation among children with cerebral palsy

Children with cerebral palsy, having drooling were selected for the study. The level of drooling was measured using drooling quotient. Drooling was observed and scored during two periods of 10 minutes separated by a 30 minutes break. The presence or absence of drooling was evaluated at every 15 seconds interval over a 10 minutes period (40 observations) while the children were awake and sitting erect. An episode of drooling is defined as new saliva leaving the chin. The drooling quotient, expressed as percentage, is calculated as the number of drooling episodes in 10 minutes divided by 40 observations. This study assessed the drooling quotient among children with cerebral palsy. The mean score of pretest drooling quotient was 83.55% with a standard deviation of 4.46.

Giestel (2002) conducted a similar study on the effect of oral motor stimulation on drooling among children with cerebral palsy having drooling. In this study there were 39 children within an age range of 6 to 18 years and their severity of drooling was assessed by using drooling quotient scale. Oral motor stimulation was given for 5 months. Post test was done using same scale. Results revealed that there was a significant reduction in drooling.

5.3 Second Objective: To assess the level of drooling after administration of oral motor stimulation among children with cerebral palsy

After assessing the level of drooling using the Drooling Quotient, Oral Motor Stimulation was administered to the children. The child was seated on a cerebral palsy chair with cut out lap board to keep the trunk upright, shoulders and arms rested forward rested on the lapboard, hips and knees flexed to 90 degree, ankles in 90 degree and feet firmly rested on the foot rest. Oral motor stimulation consisted of four interventions like applying pressure, stroking, tapping and stretching around the oral cavity. It was given for 20 minutes daily for a period of one month. The mean score of post test drooling quotient was 72.05% with a standard deviation of 7.41.

5.4 Effect of oral motor stimulation on drooling among children with cerebral palsy

Twenty five children with cerebral palsy having drooling were selected for the study. The severity of drooling was assessed before and after oral motor stimulation using drooling quotient. The mean pretest drooling quotient score was 83.55 with a standard deviation of 4.46. The mean post test drooling quotient score was 72.05 with a standard deviation of 7.41. The mean difference of pre and post test score was 11.57. The calculated ‘t’ value 7.69 was compared with table value at 0.001 level of significance and the result showed that, the calculated ‘t’ value was greater than table value. Hence the research hypothesis, “There is a significant difference in drooling quotient among children with Cerebral Palsy before and after administering oral motor stimulation,” is accepted.

Henry (2002) conducted a pilot project for children who attended the drooling clinic. The aim was to investigate the effectiveness of the Oral motor training Program in reducing drooling. The study consisted of twelve cerebral palsy children with drooling. Visual analogue scale and Drooling Quotient (DQ) were used to measure the severity of drooling before and after the Oral motor training Program. Improvement occurred in 75% of children after receiving the Oral motor training Program for 3 months.

5.5 Association between Selected Demographic Variables with Drooling Among Children with Cerebral Palsy

Chi square test was used to assess the association between the selected demographic variable and the level of drooling among children with cerebral palsy. It was found that chi square value obtained for age was 11.99 with degree of freedom 2 and table value obtained was 9.21 which was lesser than the calculated value. It is also found that the chi square value obtained for ability to close lips was 6.02 with degree of freedom 1 and table value obtained was 3.84 which was lesser than the calculated value. Hence it was proved that there was a significant association between drooling and age (at 0.01 level of significance) and also ability to close lips (at 0.05 level of significance) among children with cerebral palsy.

It was also identified that the other demographic variables like, gender, birth weight and problems during neonatal period were not associated with drooling among children with cerebral palsy.

SUMMARY AND CONCLUSION

This chapter summarizes the major findings, limitations, implications in the field of nursing education, nursing practice, nursing administration, nursing research and recommendations for further research.

The study was conducted to identify the effectiveness of oral motor stimulation on drooling among children with cerebral palsy in, Amrit centre for special needs and Women Volunteer service (WVS) special school. Pre experimental one group pre test post test design was adopted for the study. Purposive sampling technique was used to select the samples for this study. Total number of samples selected for the study was 25. Level of drooling was assessed using drooling quotient before intervention. Oral motor stimulation was given to children for a duration of 20 minutes for one month. After intervention level of drooling was assessed again using the same scale. Paired 't' test was used to find out the effect of oral motor stimulation on drooling among children with cerebral palsy. The findings from the study concluded that, oral motor stimulation was an effective non pharmacologic intervention for reducing drooling in children with cerebral palsy.

6. 1 Major Findings of the Study

6.1.1 Majority (56%) of them were within the age group of 6-8 yrs.

6.1.2 Fifty two percentage of children were males.

6.1.3 Seventy six percentage of them belong to Hindu religion.

6.1.4 Educational status of fathers and mothers showed that majority of them had high school education.

6.1.5 Antenatal history showed that 16% had prenatal problems like gestational diabetes mellitus or pregnancy induced hypertension. 20% of mothers had prolonged second stage, 28% of mothers had history of premature rupture of membrane present. 12% of them had forceps delivery and 16% had cesarean section.

6.1.6 Physical examination findings showed that, 52% of children were not able to close their lips completely.

6.1.7 The mean pretest drooling score was 83.55% with a standard deviation of 4.46. The mean post test drooling score was 76.05% with a standard deviation of 7.41. The mean difference of pretest and post test scores was 11.57.

6.1.8 The calculated ‘t’ value was 7.69 which was greater than the table value. Hence, there is a significant difference between the pretest & post test scores.

6.19 Chi square test was used to find the association between selected demographic variables on level of drooling among children with cerebral palsy. It was found that there was a significant association between drooling and selected demographic variables like age and ability to close lips among children with cerebral palsy.

6.2 Limitations

The study was confined to small number of subjects and shorter period.

6.3 Recommendations

6.3.1 Oral motor stimulation can be used as a routine non-pharmacological intervention among cerebral palsy children who have drooling.

6.3.2 Comparative study can be conducted on acupressure and oral motor stimulation on drooling among children with cerebral palsy.

6.4 Nursing Implications

The pediatric nurses have a major role in providing compassionate care to children. They have a great responsibility in helping children for monitoring and managing care especially for those children with disabilities like cerebral palsy. Oral motor stimulation is one of the cost effective method in reducing drooling among children with cerebral palsy. Results of this study have implications in nursing education, nursing practice, nursing administration and nursing research.

6.4.1 Nursing Education

Children with cerebral palsy receive various methods of treatment divided into surgical and non-surgical approach. Surgical technique involves either the transplantation of parotid duct, the removal of salivary gland, sectioning of chordatympani and tympanic nerve or combination of these procedures. Non-surgical techniques include pharmacological therapy, radiotherapy, and behavior therapy. Pharmacological therapy includes anticholinergic, scopolamine, benzotropine and glycopyrolate. Botulinum toxin A injection to salivary gland has been found to reduce drooling. Among these therapies, oral motor stimulation is one of the alternative treatments. In the field of nursing education, administration of oral motor therapy is concerned with holistic care of patients. Thus, it is appropriate to incorporate alternative therapies like oral motor stimulation in to the nursing curriculum.

6. 4. 2 Nursing Practice

Nursing practice consists of a body of knowledge that is always changing with new innovations. Integration of innovations into nursing practice improves the quality of care provided to the pediatric population. Oral motor stimulation reduces drooling among children with cerebral palsy. The intervention of oral motor stimulation enhances the skill of pediatric nurses. Hence, oral motor stimulation can be adopted as a routine intervention in children with cerebral palsy.

6. 4. 3 Nursing Administration

When non-pharmacological therapy advances, the administrator has the responsibility of providing pediatric nurses with substantial continuing nursing education opportunities and enabling them to update their knowledge with current research findings. The nurse administrators must draw written policies regarding the benefits of oral motor stimulation on drooling among children with cerebral palsy.

6.4.4 Nursing Research

Nursing research must focus more on the evidence based and holistic practice by understanding the various techniques that can bring about significant positive physical and psychological outcomes for children. The findings of the present study can be utilized by the nurse researcher to contribute to new knowledge regarding drooling management. The results from the present study will help the pediatric nurses in managing drooling among children with cerebral palsy.

6.5 Conclusion

Oral motor stimulation is a non pharmacological therapy used in the present study to evaluate the level of drooling among children with cerebral palsy. The findings revealed that, oral motor stimulation was effective in reducing drooling. The therapy is also cost effective. Hence, all pediatric nurses should adopt this intervention in their clinical practice to reduce drooling among children with cerebral palsy.

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CERTIFICATE FOR ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation, **"EFFECT OF ORAL MOTOR STIMULATION ON DROOLING AMONG CHILDREN WITH CEREBRAL PALSY"** done by **REKHA M.P** II YEAR M.sc Nursing, College of Nursing, Sri Ramakrishna Institute of Paramedical Sciences, Coimbatore has been edited for English language appropriateness.

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FROM

PROF: T. NIRMALA

THE PRINCIPAL,

COLLEGE OF NURSING

SRIPMS

COIMBATORE

TO MRS. NALINI JAYAPRAKASH

PRINCIPAL /COORDINATOR

AMRIT CENTRE FOR SPL NEEDS

Respected Sir/Madam,

Mrs REKHA. MP is a 2nd year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and As a part of her M.Sc Nursing Program. She has to undertaken the following study for her research EFFECT OF ORAL MOTOR STIMULATION ON **DROOLING AMONG CHILDREN WITH CEREBRAL PALSY**". shewould like to do the above said study in your reputed institution. I humbly request you to grant her the permission to conduct the study in your esteemed institution.

Date

Thanking you.

Yours sincerely,

MrsRekhamp

Place

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PERMISSION LETTER FOR CONDUCTING THE STUDY

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The Administrator,

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Respected sir/madam,

Subject: Requesting permission to conduct study

I am Mrs.Rekha.mp doing my 2nd year M.Sc Nursing in Sri Ramakrishna Institute of paramedical sciences and as a part of my M.Sc Nursing program, I have undertaken the following study for my research, **EFFECT OF ORAL MOTOR STIMULATION ON DROOLING AMONG CHILDREN WITH CEREBRAL PALSY.** I would like to do the above said study in your reputed institution. I humbly request you to grant me the permission to conduct the study in your esteemed institution.

Thanking you

Date:

Yours sincerely

Place:

Mrs.Rekha mp

4/11/13

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College of Nursing
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Ashirwad Special S...
No, Subramaniam...
R.S. Puram, Coimbatore - 64...

FROM

PROF: T. NIRMALA

THE PRINCIPAL,

COLLEGE OF NURSING

SRIPMS

COIMBATORE

TO The Principal of
WVS (Kavundampalayam)

Respected Sir/Madam,

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Date

Place

Thanking you.

Yours sincerely,

MrsRekhamp

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REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND CONTENT

From

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To

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The Principal,

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Respected Sir/Madam,

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I am Mrs. Rekha M.P doing my 1st year M.Sc. Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc. Nursing program. I have undertaken the following study for my research, **EFFECT OF ORAL MOTOR STIMULATION ON DROOLING AMONG CHILDREN WITH CEREBRAL PALSY AT SELECTED CENTRES IN COIMBATORE.** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

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Yours sincerely,

MrsRekhamp

REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND CONTENT

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Thanking you.

Coimbatore,

Yours sincerely,

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Thanking you.

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Yours sincerely,
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Coimbatore.

To

Prof. Emerentia
pediatric nursing department
RVS college of nursing
sulur.

Through

The Principal,

College Of Nursing,SRIPMS,

Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to validate the tool and content

I am Mrs.Reshmi.mp, doing my 1I[st] year M.Sc Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc Nursing Program. I have undertaken the following study for my research "**Effect of acupressure on academic stress among adolescents at selected school,coimbatore**". The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

Coimbatore,

yours sincerely,

Mrs.Reshmi M.P

PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

REQUISITION LETTER TO VALIDATE THE RESEARCH TOOL AND CONTENT

From

Rekha M.P
M.Sc (Nursing) II year,

College Of Nursing, SRIPMS,

Coimbatore.

To

Prof. Emerentia
pediatric nursing department
RVS college of nursing
sulur.

Through

The Principal,

College Of Nursing,SRIPMS,

Coimbatore.

Respected Sir/Madam,

Subject: Requesting permission to validate the tool and content

I am Mrs. Rekha M.P doing my 1st year M.Sc. Nursing in Sri Ramakrishna Institute of Paramedical Sciences and as a part of my M.Sc. Nursing program. I have undertaken the following study for my research, **EFFECT OF ORAL MOTOR STIMULATION ON DROOLING AMONG CHILDREN WITH CEREBRAL PALSY AT SELECTED CENTRES IN COIMBATORE.** The following tool is tend to be used, hence I request you to kindly give me a valuable suggestion and necessary modification for the same.

Thanking you.

Coimbatore,

PRINCIPAL
College of Nursing
Sri Ramakrishna Institute of Paramedical Sciences
Coimbatore - 641 044

Yours sincerely,

MrsRekhamp

Acknowledgement

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